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ABSTRACT

The effects of students' preferred learning styles on perceived individual academic achievement, attitudes toward the learning environment, and course completion rates were examined in a distance education setting. Nine female graduate education students attended weekly classes on a Texas Tech University campus in Lubbock, and 17 female graduate education students attended weekly classes at a remote distance learning site in Odessa (Texas). Both groups of students were simultaneously taught, using the same course content. Data were collected for 14 weeks. All students completed the course and responded to the 25-item Student Data Profile Survey, a 25-item course pretest and posttest, the Canfield Learning Styles Inventory, and the Course Follow-Up Survey. Findings suggest that learning style preferences may affect academic achievement and attitude of students involved in distance education settings, replicating the results of studies of students in traditional classroom settings. Learning style instruments could be given to students in distance education courses, and instructors could vary instruction to encompass the different preferences, conforming instruction toward the modality through which students learn best. One table presents study findings. (Contains 13 references.) (SLD)

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The Impact of Students' Preferred Learning Style Variables in a Distance Education Course: A Case Study

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This study examined the effect of students' preferred learning style on attitude, course completion rates, and perceived academic achievement in a distance education classroom. The data indicated learning style preferences may affect academic achievement and attitude of students involved in distance education.

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The Impact of Students' Preferred Learning Style Variables in a Distance Education Program: A Case Study

For over 100 years, learners have participated in learning at a distance through the use of traditional correspondence courses where self-paced study guides and paper-based assignments have remained the primary mode and method of instruction (Gough, 1980; Johnson & Amundsen, 1985). Currently, there is little research-based consensus as to the absolute effectiveness of this or other forms of distance education for students with varying learning styles who choose to take distance education classes. The growing interest of the use of technology to deliver instruction has warranted the need for additional research of distance education technologies.

The growing interest of the use of technology to deliver instruction has warranted the need for additional research of distance education technologies. Research in applying effective teaching practices and curriculum design on student motivation and achievement in traditional classroom settings is plentiful (Brophy & Good, 1986; Gagne' & Glaser, 1987; Romberg & Carpenter, 1986). Far fewer studies consider such practices and design in respect to distance education (Coggins, 1989).

There is a lack of research-based guidelines that accurately identify important differences that may exist between instructional variables relevant to students learning in traditional and distance education classroom settings. Without guidelines that are specifically

based on findings from distance education research, instructional technologists are forced to continue to subjectively apply findings from current traditional classroom research when designing distance education courses and programs. Such designs may be less than effective because they are based on the assumption that the learning situation of students involved in distance education learning is congruent with the learning situation that occurs in a traditional classroom setting.

Past research indicates that how students perceive their learning abilities and the learning demands required from different media significantly influence their attitude and their overall learning performance (Coggins, 1989). Learners' perceptions about characteristics of instructional delivery media and their ability to learn using the media have been shown to be key determinantes in predicting student motivation and success in traditional classroom instructional environments (Clark & Salomon, 1986). Considering the unique affects that different learning environments, different media applications, and differing conditions of instruction have on learner perception and behavior may be especially important when designing technology-based learning systems. The effects may also be equally important when implementing media as the major source of information transfer to students learning at a distance. In addition to learner perceptions other issues may also affect students' learning outcomes.

There is an abundance of studies that focus on the affect of students' learning style preferences on learning outcomes in traditional classroom settings. Several studies have found academic achievement is

positively effected when teaching correlates with students' preferred learning style (Dunn, Beaudry, & Klavas, 1989; Dunn, Dunn, & Price, 1977; Mickler & Zippert, 1987; Miller, Alway, & McKinley, 1987). These studies have focused on student achievement and perception in the traditional classroom setting. In contrast, the majority of distance education studies have ignored how adult students' learning style characteristics may differently affect their educational experiences when pursuing instruction outside of traditional classroom settings (Lee, 1984). This limitation makes applying instructional prescriptions from past research to the design of effective distance education learning environments more of a subjective task than a systematic application. Therefore an issue that surfaces is how students' learning style preferences and perceptions affect their learning outcomes in a distance education setting.

The purpose of this paper is to report on a study conducted to examine the influence of individual learning style preferences on student achievement of course content, course completion rates, and attitudes about learning in an on-campus and an off-campus distance education classroom.

Background

Students were 26 education majors enrolled in a credit-based graduate learning resources education course in Spring, 1990. The students were self-assigned to one of two groups (On-Campus Classroom or Distance Education Remote Classroom) based on their enrollment in one of

two course delivery sites. The On-Campus Classroom group consisted of 9 students who attended weekly classes on the Texas Tech University campus, Lubbock, Texas. The Distance Education Remote Classroom group contained 17 students who attended weekly classes at a remote classroom site in Odessa, Texas. Both groups were simultaneously taught by the same instructor and received identical course content. The instructor was physically present in the same room with the students in the On-Campus Classroom. The students in the Distance Education Remote Classroom received instruction using a two-way television system. The instructor and students in both groups had two-way audio and visual interaction with the use of the two-way television system.

Data was collected over a period of 14 weeks to measure the relative effects of preferred learning style variables on individual academic achievement, attitude toward the learning environment, and course completion rates within the group of students in the On-Campus Classroom and within the group of students in the Distance Education Remote Classroom. At the beginning of the first class session, all students were administered the Student Data Profile Survey. The survey instrument consisted of 25 items used to gather subjects' demographic information, such as name, gender, telephone number, home address, ethnic background, and academic status.

In addition to the survey instrument, a course pretest was administered to all students. The course pretest was a 25-item instrument used to measure two variables: (1) students' perception of the degree of their knowledge of course content, and (2) their

perception of their degree of mastery of skills related to the objectives of the course prior to instruction.

The third instrument administered to all students was the Canfield Learning Styles Inventory (CLSI). This instrument was used to identify the students' primary learning style. Subscale reliabilities on the CLSI range from .52 to .99. The face validity of the CLSI has been determined from use with several thousands of adult students (Coggins, 1989). The CLSI groups students into the following nine learner typologies (Canfield, 1980):

1) social (preference to work with others),
2) independent (preference to work independently),
3) applied (preference for relating real-life experiences to learning),
4) conceptual (preference for organized language-oriented concepts),
5) neutral preference (does not have a strong learning preference),
6) social/applied (preference to work with others and relate real-life experiences to learning),
7) social/conceptual (preference to work with others with organized language-oriented concepts),
8) independent/applied (preference to work independently and relate real-life experiences to learning), and
9) independent/conceptual (preference to work independently with organized language-oriented concepts).

During the final class session a course posttest, which was the same instrument as the pretest, was administered to all students.

The Course Follow-Up Survey instrument was also administered at this time. The instrument consisted of 30 items used to measure students' attitudes about their learning experience in the course. Three specific instructional variables measured by the instrument were students' attitude about course content, attitude about learner opportunity, and attitude about the mode of delivery media.

Findings

All of the participants (100%) were female with 33% of individuals over the age of 40, 33% over the age of 30, and 33% over the age of 20 in the on-campus classroom, and 65% over the age of 40, 23% over the age of 30, and 12% over the age of 20 in the off-campus classroom at the beginning of the course. Within the on-campus classroom, approximately 89% of the students were Anglo with 33% reporting a distance of over 50 miles to the nearest college or university while 33% reported 20 to 50 miles and 33% reported less than 20 miles. All students (100%) in the off-campus class were Anglo and reported a distance of over 50 miles to the nearest college or university. The class was a required course for the majority (78%) of on-campus individuals and off-campus individuals (94%), whereas it was also the first Learning Resource Specialist course for 22% of the on-campus participants and 41% of the off-campus students. The majority of on-campus participants' average number of hours per week to learn most course materials was less than 1 (11%), 1-3 (67%), 4-7 (11%), and 8-11 (11%) in comparison to their expected average number of hours per week to learn the course materials, less than 1

(11%), 1-3 (67%), and 4-7 (22%), in the current course. Students in the off-campus class reported an average number of hours per week to learn most course materials was less than 1 (6%), 1-3 (23%), 4-7 (53%), and 8-11 (18%) while reporting their expected average number of hours per week to learn the course materials in the current course as 1-3 (18%), 4-7 (59%), and 8-11 (23%). Seventy eight percent of on-campus students were currently teaching with 57% of the individuals teaching in the elementary grades and 44% having less than 3 years teaching experience, 22% having 3-10 years experience, and 33% having 11 or more years of teaching experience. Eighty two percent of the off-campus students were currently teaching with 82% teaching in the elementary grades. Six percent of off-campus students reported having less than 3 years teaching experience, 41% having 3-10 years experience, and 53% having 11 or more years of teaching experience. The majority of on-campus participants had not had any courses through the means of telenetworking (100%), correspondence (89%), or teleconference (100%); however, they expected to receive a grade of "A" (100%) in this course. In contrast, most off-campus students had not had any courses through the means of telenetworking (94%), correspondence (82%), or teleconference (100%). The majority of these students (94%) also expected to receive a grade of "A" in this course.

The On-Campus Classroom in Lubbock, Texas, included learner typologies of Social/Applied (1), Social (3), Social/ Conceptual (3), and Conceptual (2). The Distance Education Remote Classroom in Odessa, Texas, included learner typologies of Social/Applied (7), Social (3),

Neutral (1), Social/Conceptual (4), Conceptual (1), and Independent/Conceptual (1).

Due to the low number of subjects involved, academic achievement and attitude scores between the different learning style groups of subjects in the on-campus and off-campus classrooms were reported as mean scores (see Table 1). In the On-Campus Classroom the subjects identified in the Social/Applied learning style group had the highest mean scores in three of the five areas, the Course Posttest, the Course Follow-Up Survey, and the Course Follow-Up Survey Learner Opportunity scores. Subjects identified in the Conceptual learning style group had lower mean scores in all areas.

TABLE 1

TABLE OF MEANS

Learning Style Group	Course Posttest	CFUS	CFUS Course Content	CFUS Learner Opportunity	CFUS Delivery Mode
On-Campus Classroom:					
Social/Applied	218.0	94.0	18.0	38.0	38.0
Social	196.7	90.7	18.3	36.3	37.0
Social/Conceptual	195.7	91.7	19.0	33.7	39.0
Conceptual	184.5	83.0	16.5	30.5	36.0
Distance Education Remote Classroom:					
Social/Applied	188.9	89.7	17.9	32.0	39.9
Social	200.3	84.3	17.0	31.0	36.3
Neutral	212.0	100.0	20.0	38.0	42.0
Social/Conceptual	182.8	78.8	16.0	27.5	35.2
Conceptual	215.0	96.0	19.0	37.0	40.0
Independent/ Conceptual	220.0	100.0	19.0	38.0	43.0

CFUS = Course Follow-Up Survey

In the Distance Education Remote Classroom the subjects identified in the Independent/Conceptual learning style group had the highest mean

scores in all of the areas, whereas subjects identified in the Social/Conceptual learning style group had the lowest mean scores in all of the areas. In this particular study, it seems learning style preferences of students learning at a distance affects academic achievement and attitude. Due to the low number of subjects in this study, additional studies involving more subjects are needed for this assumption to be conclusive to determine if findings can be generalized to a larger population.

Attendance records revealed that all of the students completed the course. Therefore, there was a 100% completion rate of subjects in the On-Campus Classroom groups and in the Distance Education Remote Classroom group.

Discussion

Differences occurred in the attitude and perceived academic achievement scores in each of the learning style groups. In the comparison of learning style typologies, certain groups had either consistently higher or lower scores in the majority or all of the areas studied. This finding suggests learning style preferences may affect academic achievement and attitude of students involved in distance education settings, therefore, replicating the results of studies of students in traditional classroom settings (Dunn, Beaudry, & Klavas, 1989; Dunn, Dunn, & Price, 1977; Mickler & Zippert, 1987; Miller, Alway, & McKinley, 1987).

All students completed the course. All of the students were graduate students thereby already displaying a great desire to attend and complete the course. Completion of the course was a requirement for partial fulfillment of a Learning Resource Specialist certificate, therefore serving as a great motivator for students to finish. Based on these findings, several implications and recommendations can be made toward the design and delivery of distance education.

Implications and Comments

If the results of further study demonstrate comparable results, then the following suggestions can be applied. In striving to increase students' academic achievement and attitude in distance education courses, learning style instruments that are easily completed, such as the Canfield Learning Styles Inventory, could be given to students. The results of the learning style instruments could be used by instructors in determining the materials and mode of instruction utilized during the course. Instructors should vary instruction to encompass the different learning modalities. Identification of learning style preferences of students enrolled in a course would enable instructors to conform instruction towards the modality through which students learn best. Instructional designers could use the information in designing new, novel methods of instruction using technology that will support and enhance individual student needs. In addition, advisors could make informed recommendations to students toward pursuing enrollment in distance education courses based on the results of the instruments.

Faculty teaching with distance education media could look at the results of the study when designing courses to meet individual needs and identify variables that influence students' academic achievement and attitude in distance education programs. Further research is needed in the area of learning variables, such as learning style preferences and learner attitudes, that can ultimately affect students' success in such programs.

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